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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/026,352	12/21/2001	Mauricio Calle	Calle 14-2/064	8092

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EXAMINER	
SONG, JASMINE	

ART UNIT	PAPER NUMBER
2188	5

DATE MAILED: 10/27/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/026,352	CALLE ET AL.	
	Examiner	Art Unit	
	Jasmine Song	2188	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *15 July 2002* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-13* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-13* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *15 July 2002* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

Detailed Action

1. Claims 1-13 are represented for examination.

Specification

2. The lengthy specification has not been checked to the extent necessary to determine the presence of all possible minor errors. Applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.

Drawings

3. The drawings filed on 07/15/2002 have been approved by the Examiner.

Oath/Declaration

4. The applicant's oath/declaration has been reviewed by the examiner and is found to conform to the requirements prescribed in 37 C.F.R. 1.63.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6. Claims 1-3,5-10 and 12 arerejected under 35 U.S.C. 103(a) as being unpatentable over Cherukuri., U.S. Patent 6006307, in view of Rusu et al., U.S. Patent 6137807.

Regarding claims 1 and 6, Cherukuri teaches that a method of memory management, comprising:

providing multiple banks of memory devices organized into independent channels wherein each bank of memory devices contains duplicate data (col.2, lines 35-40);

providing a tree memory controller (memory control unit 22 as shown in Fig.1) for controlling data read and write accesses to each of the banks in each of the channels (col.4, lines 50 to col.5, lines 14);

sending read or write requests to the tree memory controller (col.5, lines 22-26);

establishing a bank queue for each bank in each channel (Fig.5, col.6, lines 63-67);

cherukuri does not teach that a bank queue for each bank designates bank availability; checking, at the tree memory controller, the availability of each bank; identifying a first available bank; and executing the read request from the first available bank.

However, Rusu et al., teach that a bank queue for each bank (Fig.1A, one of queue memory bank 1 and bank 2) designates bank availability (col.4, lines 32-35); checking, at the tree memory controller, the availability of each bank (col.4, lines 35 and lines 49-52); identifying a first available bank (it is taught as the most unused memory,

col.4, lines 50-52); and executing the read request from the first available bank (col.4, lines 35 and lines 49-52).

As taught by Rusu, the use of the bank queue for designating bank availability, checking and identifying the availability of each bank and executing the read request from the available bank has the advantages of providing for balanced queue memory utilization to prevent queue congestion and overflow problems and to provide for queue control management providing for bidirectional simultaneous data flow permitting both input and output queuing to be performed concurrently (col.1, lines 20-27). It would have been obvious to one having ordinary skill in the art at the time the invention was made to utilize the teachings of Rusu in the system of Cherukuri and have the bank queue for designating bank availability, checking and identifying the availability of each bank and executing the read request from the available bank for the advantages stated above.

Accordingly, one of ordinary skill in the art would have recognized this and concluded that they are from the same field of endeavor. This would have motivated one of ordinary skill in the art to implement the above combination for the advantages set forth above.

Regarding claim 2, ~~hua~~ Cherukuri teaches that wherein the step of executing for a write access includes:

Blocking all read requests (col.5, lines 26);

Confirming that data to be written is complete for the selected memory word length (col.5, lines 22-24);

Waiting for each bank queue to indicate bank availability for all banks concurrently (col.6, lines 63 to col.7, lines 14).

Regarding claim 3, Cherukuri teaches that the memory device comprise dynamic random access memory DRAM devices (col.4, lines 40-41).

Regarding claim 5, Cherukuri teaches that the banks of memory devices are organized into two independent channels (col.2, lines 36-38).

Regarding claim 7, Cherukuri teaches that the controller suspends all read requests during processing of a write request (col. 5, lines 22-26).

Regarding claim 8, Cherukuri teaches that the controller writes to all memory banks concurrently (col.4, lines 62-63).

Regarding claim 9, Cherukuri teaches that all memory banks contain identical data (col.2, lines 38-40 and col.4, lines 30-32).

Regarding claim 10, Cherukuri teaches that the memory banks comprise dynamic random access memory devices (col.4, lines 40-41).

Regarding claim 12, Cherukuri teaches that the banks of memory devices are arranged in two independent channels (col.2, lines 36-38).

7. Claims 4 and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Cherukuri., U.S. Patent 6,006,307 and Rusu et al., U.S. Patent 6,137,807, and further in view of Kawaguchi., US 2001/0030900 A1.

Regarding claims 4 and 11, Cherukuri and Rusu teach the claimed invention as noted above (the rejection of claims 1 and 6 is incorporated with herein), Cherukuri and Rusu do not teach that the memory device comprise fast cycle random access memory FCRAM devices. However, Kawaguchi teaches that memory device comprises fast cycle random access memory FCRAM devices (col.1, section 0011)

As taught by Kawaguchi, the use of FCRAM having a late write function has the advantages of preventing operation errors of the FCRAM during auto-refresh, reducing the current consumption of the FCRAM during auto-refresh, improving the reliability of a memory cell of the FCRAM, and increasing the margin of refresh cycle time of the FCRAM (col.1, section 0011). It would have been obvious to one having ordinary skill in the art at the time the invention was made to utilize the teachings of Kawaguchi in the system of Cherukuri and Rusu and have the FCRAM memory device for the advantages stated above.

Accordingly, one of ordinary skill in the art would have recognized this and concluded that they are from the same field of endeavor. This would have motivated

one of ordinary skill in the art to implement the above combination for the advantages set forth above.

8. Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over Cherukuri., U.S. Patent 6,006,307 and Rusu et al., U.S. Patent 6,137,807, further in view of Bouchard et al., US 2003/0115403 A1.

Regarding claim 13, Cherukuri and Rusu teaches the claimed invention as noted above (the rejection of claim 6 is incorporated with herein), Cherukuri and Rusu do not teach that the minimum number of memory banks is determined by the ratio of the random cycle time to the random bank access delay. However, Bouchard teaches that the minimum number of memory banks is determined by the ratio of the random cycle time to the random bank access delay (col.1, section 0010)

As taught by Bouchard, the disclosure of the minimum number of memory banks is determined by the ratio of the random cycle time to the random bank access delay has the advantages of providing a maximum data throughput (co.2, section 0013). It would have been obvious to one having ordinary skill in the art at the time the invention was made to utilize the teachings of Bouchard in the system of Cherukuri and Rusu and have the disclosure of the minimum number of memory banks is determined by the ratio of the random cycle time to the random bank access delay for the advantages stated above.

Accordingly, one of ordinary skill in the art would have recognized this and concluded that they are from the same field of endeavor. This would have motivated

one of ordinary skill in the art to implement the above combination for the advantages set forth above.

Conclusion

9. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Cowles et al.	US 6529429 B2
Satoh	US 6501690 B2
Fenwick et al.	US 6360285 B1
Bermingham et al.	US 6058451
Nattkemper et al.	US 5953318
Nattkemper et al.	US 5999518
Kerns et al.	US 6049541
Jeddeloh	US 2003/0046477 A1

10. When responding to the office action, Applicant is advised to clearly point out the patentable novelty which he or she thinks the claims present in view of the state of the art disclosed by the references cited or the objections made. He or she must also show how the amendments avoid such references or objections. See 37 C.F.R. 1.111 (c).

11. When responding to the office action, Applicants are advised to provide the examiner with the line numbers and page numbers in the application and/or references cited to assist examiner to locate the appropriate paragraphs.

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jasmine Song whose telephone number is 703-305-7701. The examiner can normally be reached on 8:00-5:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mano Padmanabhan can be reached on 703-306-2903. The fax phone numbers for the organization where this application or proceeding is assigned are 703-746-7238 for regular communications and 703-746-7239 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-305-3900.

Jasmine Song

Patent Examiner

October 15, 2003

Mano Padmanabhan 10/20/03

Supervisory Patent Examiner

Technology Center 2100